UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7359860 B1
APPLICATION NO. : 10/789,397
ISSUE DATE : 04/15/08
INVENTOR(S) : MILLER, EDWARD S.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

The title page showing the illustrative figure should be deleted to be replaced with the attached title page.

The drawing sheet, consisting of Figs. 3 and 7, should be deleted to be replaced with the drawing sheet, consisting of Figs. 3, 7A, 7B, 7C, as shown on the attached pages.

US007359860B1

(12) **United States Patent**
Miller et al.

(10) **Patent No.: US 7,359,860 B1**
(45) **Date of Patent: Apr. 15, 2008**

(54) **CALL FLOW OBJECT MODEL IN A SPEECH RECOGNITION SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 846 days.

(21) Appl. No.: **10/789,397**

(22) Filed: **Feb. 27, 2004**

Related U.S. Application Data

(60) Provisional application No. 60/451,353, filed on Feb. 27, 2003.

(51) **Int. Cl.**
G10L 15/00 (2006.01)

(52) **U.S. Cl.** 704/275; 704/270; 379/88.05

(58) **Field of Classification Search** 704/270, 704/275; 379/88.05, 88.1
See application file for complete search history.

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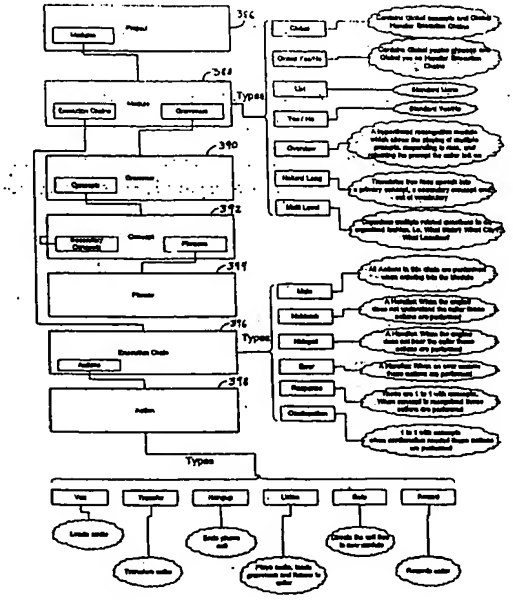
(57) **ABSTRACT**

Systems and methods are provided for embodiments of a speech recognition system call flow object model. The systems and methods organize and execute, for example, multiple question directed dialogs, overview dialogs, or natural language directed dialogs. In certain embodiments, the organizing and executing of the natural language directed dialogs uses primary and secondary concepts without requiring a structured response. The systems and methods enable the call flow designers to define particular call flows without requiring the designers to perform any programming or coding.

9 Claims, 8 Drawing Sheets



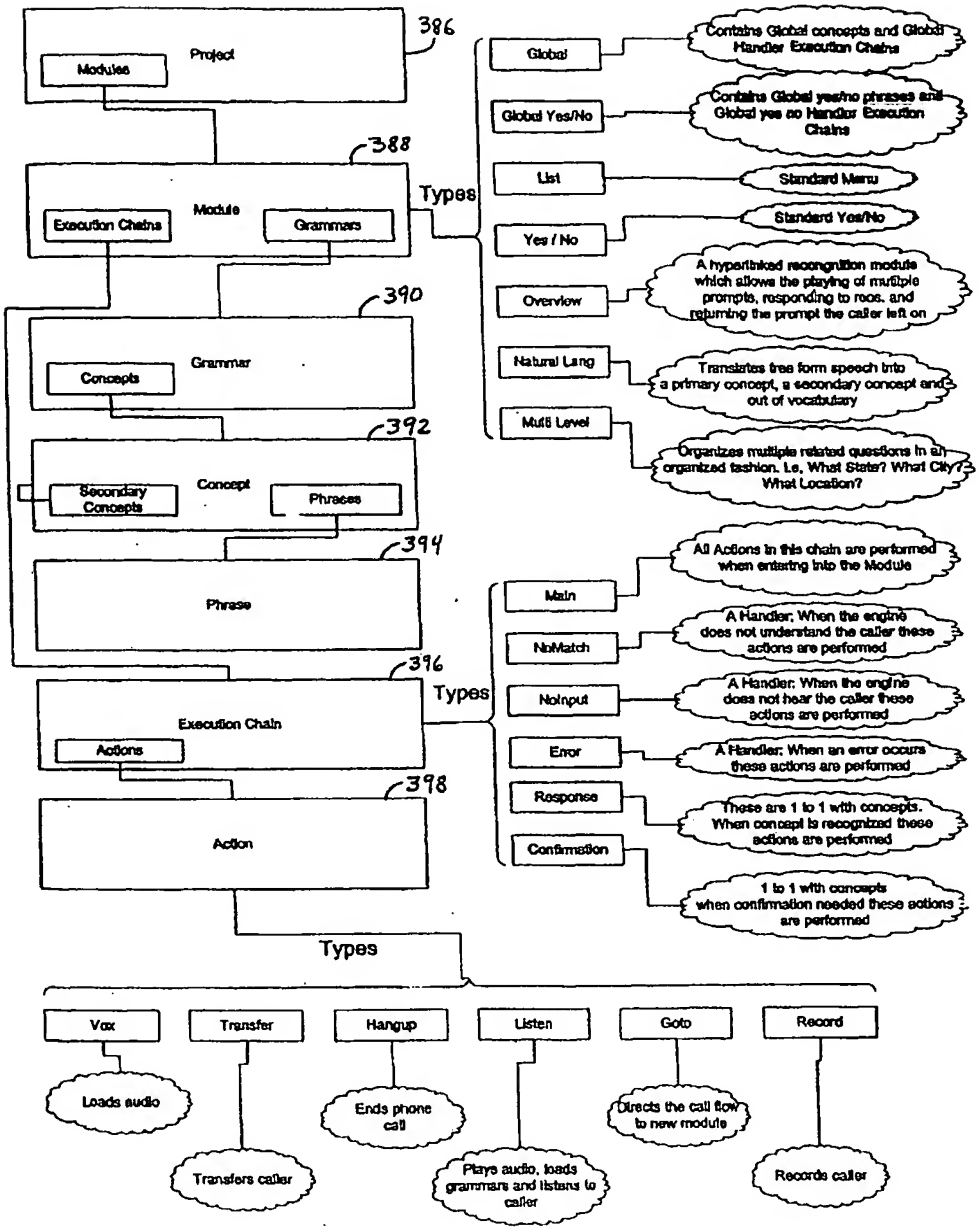

386
Project
Modules
388
Module
Execution Chains
Grammars
Types
Global
Contains Global concepts and Global Handler Execution Chains
Global Yes/No
Contains Global yes/no phrases and Global yes no Handler Execution Chains
List
Standard Menu
Yes / No
Standard Yes/No
Overview
A hyperlinked recognition module which allows the playing of multiple prompts, responding to reco. and returning the prompt the caller left on
Natural Lang
Translates free form speech into a primary concept, a secondary concept and out of vocabulary
Multi Level
Organizes multiple related questions in an organized fashion. I.e, What State? What City? What Location?
390
Grammar
Concepts
392
Concept
Secondary Concepts
Phrases
394
Phrase
396
Execution Chain
Actions
Types
Main
All Actions in this chain are performed when entering into the Module
NoMatch
A Handler; When the engine does not understand the caller these actions are performed
NoInput
A Handler; When the engine does not hear the caller these actions are performed
Error
A Handler; When an error occurs these actions are performed
Response
These are 1 to 1 with concepts. When concept is recognized these actions are performed
Confirmation
1 to 1 with concepts when confirmation needed these actions are performed
398
Action
Types
Vox
Loads audio
Transfer
Transfers caller
Hangup
Ends phone call
Listen
Plays audio, loads grammars and listens to caller
Goto
Directs the call flow to new module
Record
Records caller

FIG. 3

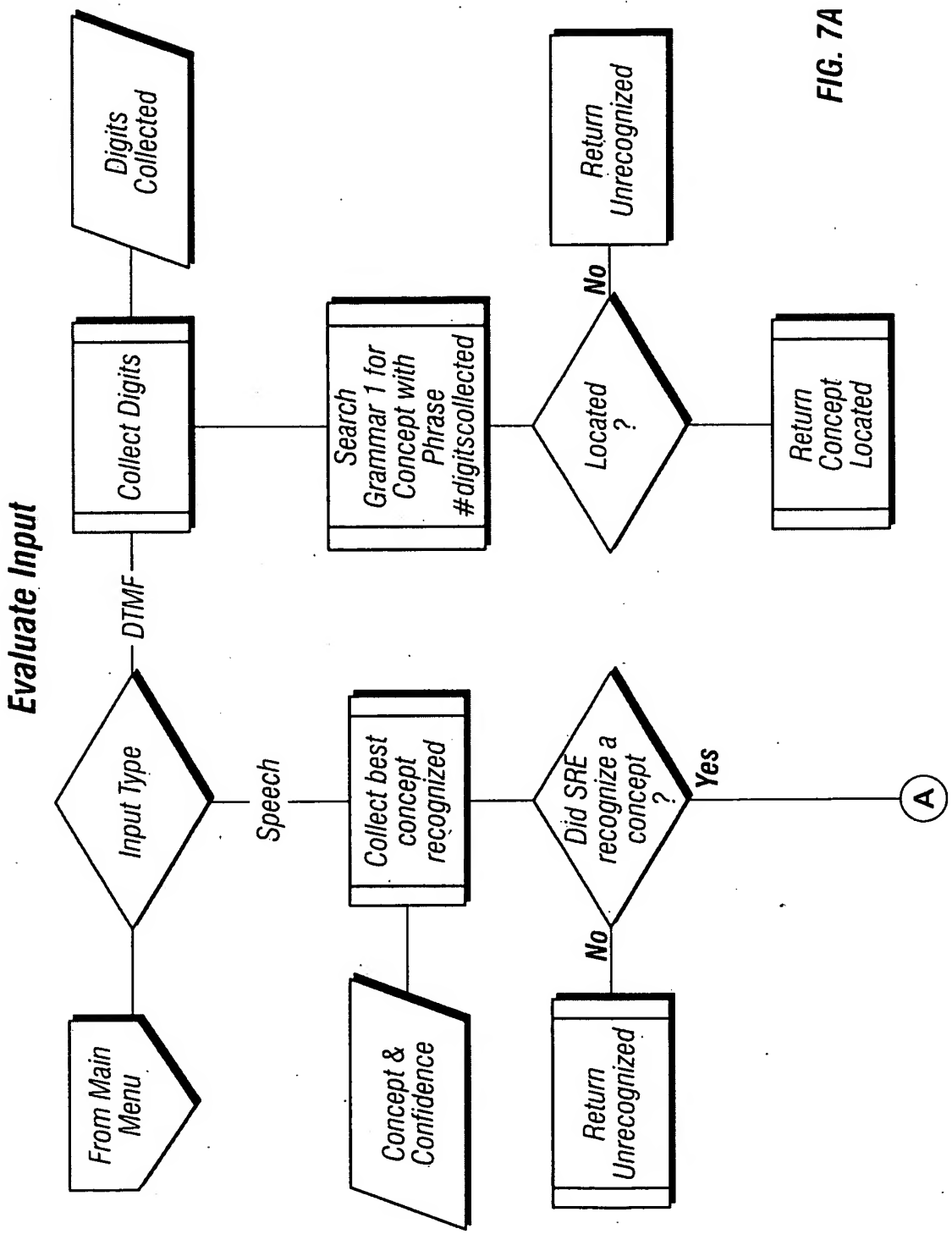

Evaluate Input
From Main Menu
Input Type
DTMF
Speech
Collect Digits
Digits Collected
Collect best concept recognized
Concept & Confidence
Search Grammar 1 for Concept with Phrase #digitscollected
Did SRE recognize a concept ?
No
Yes
Return Unrecognized
Located ?
No
Return Unrecognized
Return Concept Located
A

FIG. 7A

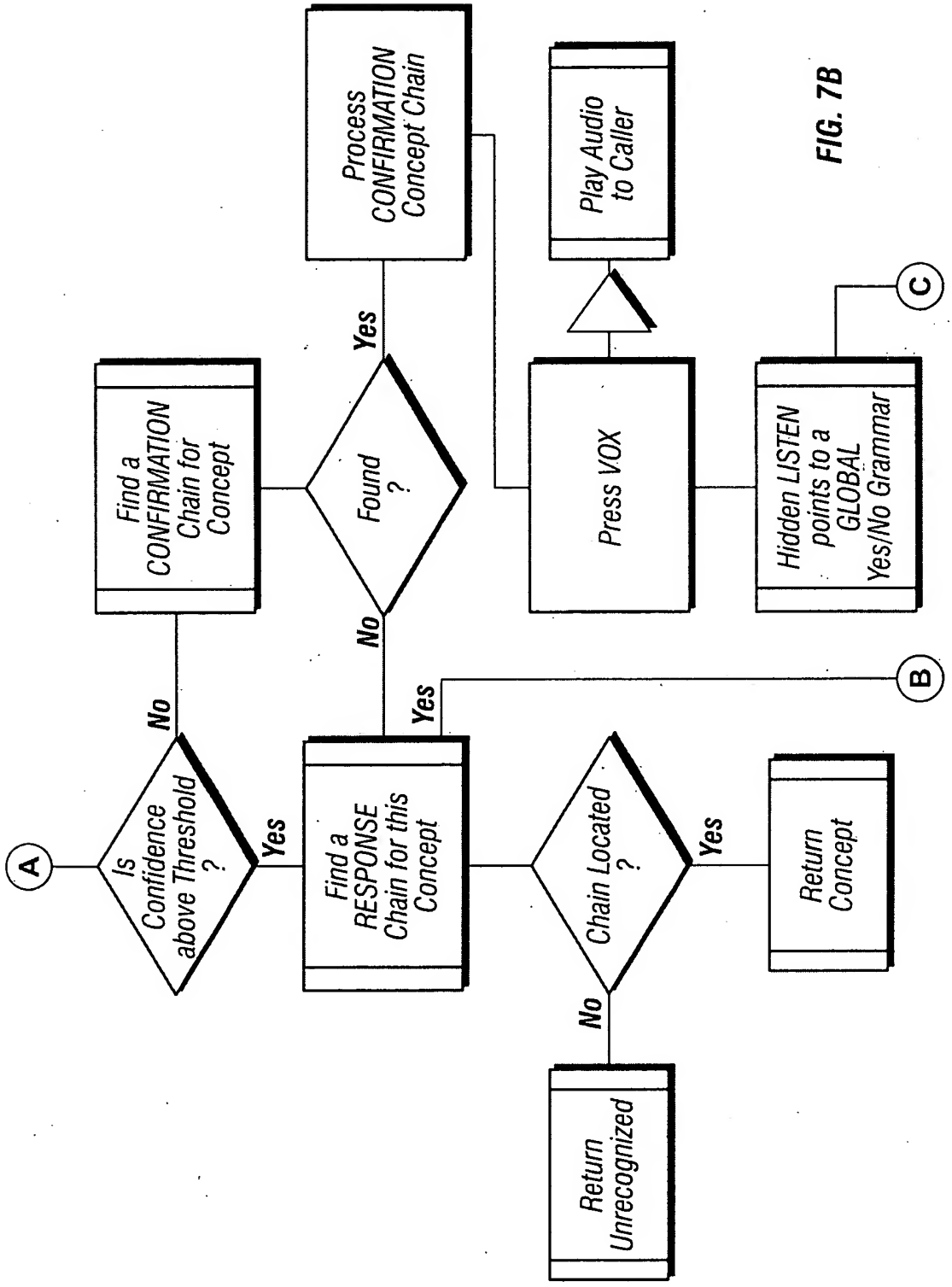

A
Is Confidence above Threshold ?
No
Yes
Find a CONFIRMATION Chain for Concept
Found ?
Yes
No
Process CONFIRMATION Concept Chain
Play Audio to Caller
Press VOX
Hidden LISTEN points to a GLOBAL Yes/No Grammar
C
B
Yes
Find a RESPONSE Chain for this Concept
Chain Located ?
Yes
Return Concept
No
Return Unrecognized

FIG. 7B

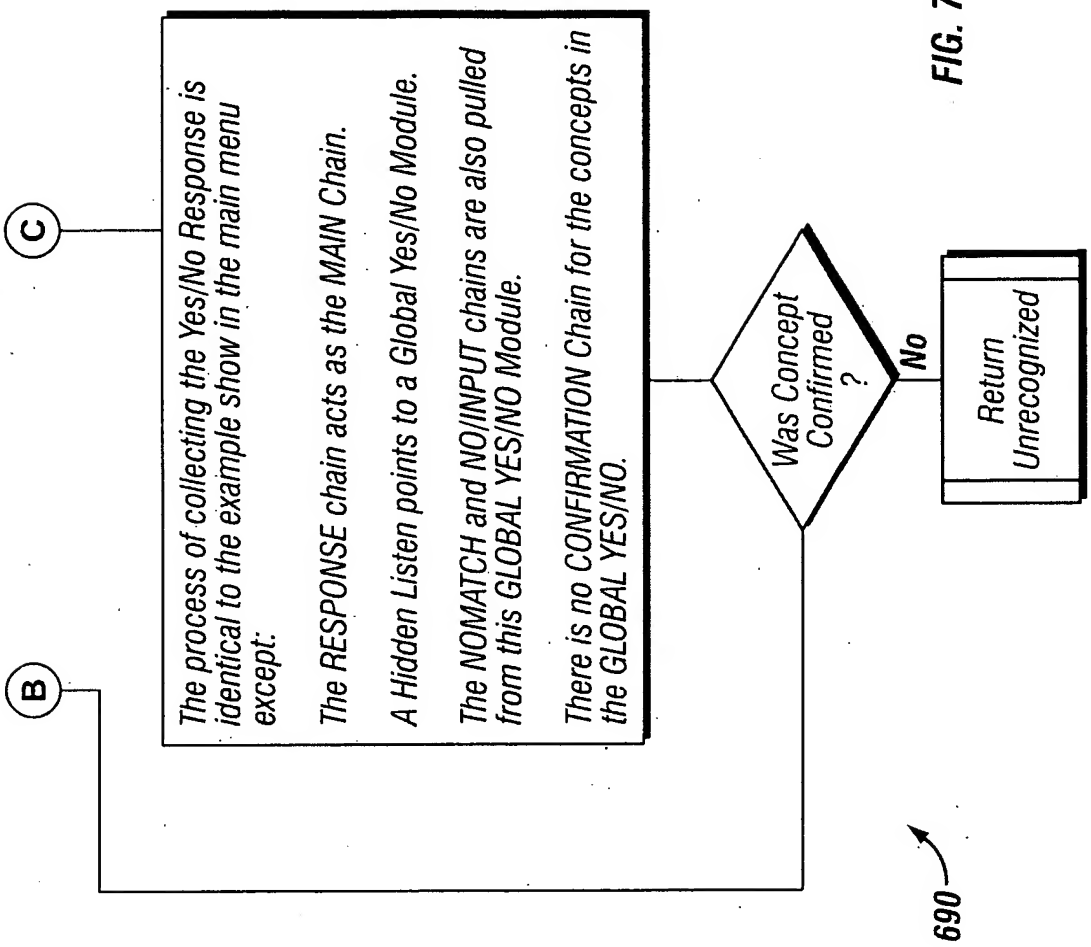

C
B
The process of collecting the Yes/No Response is identical to the example show in the main menu except:
The RESPONSE chain acts as the MAIN Chain.
A Hidden Listen points to a Global Yes/No Module.
The NOMATCH and NO/INPUT chains are also pulled from this GLOBAL YES/NO Module.
There is no CONFIRMATION Chain for the concepts in the GLOBAL YES/NO.
Was Concept Confirmed ?
No
Return Unrecognized
690

FIG. 7C